

IN THE CLAIMS

Please amend the claims to read as follows:

Listing of Claims

1. (Canceled).

2. (Currently Amended) The multi-carrier communication apparatus according to claim 1 57, wherein the demapping means and demodulating section demaps a multi-carrier signal mapped to subcarriers with a first symbol string including a first symbol to a second symbol string excluding said first symbol in predetermined symbol units and demodulates the demapped symbol pattern to obtain reception data.

3. (Currently Amended) The multi-carrier communication apparatus according to claim 1 57, wherein the demapping means and demodulating section demodulates a multi-carrier signal mapped to subcarriers with a first symbol string including a first symbol and converts the demodulated first data expressed with three discrete values to second data expressed with two discrete values.

4. (Currently Amended) The multi-carrier communication apparatus according to claim 2, wherein the demapping means and demodulating section comprises ~~storing means for storing a~~ storage section that stores a table of correspondence between a first symbol string and a second symbol string and a collating ~~means for checking~~ section that checks a received symbol string against said table.

5. (Currently Amended) The multi-carrier communication apparatus according to claim 3, wherein the demapping means and demodulating section comprises ~~storing means for storing a~~ storage section that stores a table of correspondence between a second data pattern expressed with two discrete values and a first data pattern expressed with three discrete values.

6. (Currently Amended) The multi-carrier communication apparatus according to claim 4, further comprising a retransmission requesting ~~means for requesting~~ section that requests the transmitting side for retransmission when the received symbol string cannot be associated with any patterns in the table.

7. (Currently Amended) The multi-carrier communication apparatus according to claim 4, further comprising an error correcting means for correcting section that corrects errors of a received symbol string when said symbol string cannot be associated with any patterns in the table.

8. (Currently Amended) The multi-carrier communication apparatus according to claim 1 57, wherein the demapping means and demodulating section comprises an amplitude measuring means for measuring section that measures the amplitude of a symbol mapped to each subcarrier and a pattern deciding means for deciding section that decides said first symbol string based on the measured amplitude.

9. (Currently Amended) The multi-carrier communication apparatus according to claim 1 57, wherein the demapping means and demodulating section comprises a first deciding means for deciding section that decides a subcarrier to which a first symbol is mapped according to the number of subcarriers to which the first symbol with amplitude "0" is mapped and a second deciding means for deciding section that decides symbols other than the symbol in said symbol string decided to be the first symbol through a polarity decision.

10. (Currently Amended) The multi-carrier communication apparatus according to claim ~~1~~ 57, wherein the demapping means and demodulating section performs demapping by associating a plurality of first symbol strings with one data pattern in predetermined symbol units.

11. (Currently Amended) The multi-carrier communication apparatus according to claim ~~1~~ 57, wherein the demapping means and demodulating section comprises ~~combining means for combining~~ a combiner that combines a plurality of symbols as a combined symbol, a first deciding means for deciding section that decides a symbol having the smallest amplitude value of said combined symbol as a first symbol and a second deciding means for making section that makes a polarity decision on symbols other than said first symbol.

12. (Currently Amended) The multi-carrier communication apparatus according to claim 11, wherein the ~~combining means~~ combiner selects and combines a plurality of symbols.

13. (Currently Amended) The multi-carrier communication apparatus according to claim 11, wherein the ~~combining means~~ combiner combines a plurality of symbols with an equal gain.

14. (Currently Amended) The multi-carrier communication apparatus according to claim 11, wherein the ~~combining means~~ combiner combines a plurality of symbols with a maximum ratio.

15. (Currently Amended) The multi-carrier communication apparatus according to claim ~~1~~ 57, further comprising:

a channel estimating means ~~for estimating section that~~ estimates channels using a known signal;

a replica signal generating means ~~for generating generator that generates~~ a replica signal of a first symbol string mapped to subcarriers with the first symbol string including the first symbol using the result of said channel estimation; and

a received symbol pattern deciding means ~~for deciding section that decides~~ a received symbol pattern by comparing said replica signal with the received symbol pattern; and wherein

~~demodulating means for obtaining the demapping and demodulating section obtains~~ reception data from the decided received symbol pattern.

16. (Canceled).

17. (Currently Amended) The multi-carrier communication apparatus according to claim ~~16~~ 58, wherein the mapping means and

modulating section maps the second symbol string obtained by modulating data to be sent to subcarriers with the first symbol string including the first symbol.

18. (Currently Amended) The multi-carrier communication apparatus according to claim 16 58, wherein the mapping means and modulating section converts second data expressed with two discrete values to be sent to first data expressed with three discrete values and modulates said first data to the first symbol string including the first symbol.

19. (Currently Amended) The multi-carrier communication apparatus according to claim 17, wherein the mapping means and modulating section comprises a storage section that stores ~~storing means for storing~~ a table of correspondence between the first symbol string and second symbol string.

20. (Currently Amended) The multi-carrier communication apparatus according to claim 18, wherein the mapping means and modulating section comprises ~~storing means for storing~~ a storage section that stores a table of correspondence between a second data pattern expressed with two discrete values and a first data pattern expressed with three discrete values.

21. (Currently Amended) The multi-carrier communication apparatus according to claim 16 58, wherein the mapping means and modulating section fixes the number of subcarriers to which the first symbol is mapped.

22. (Currently Amended) The multi-carrier communication apparatus according to claim 16 58, further comprising a ~~notifying means for notifying~~ section that notifies the number of subcarriers to which the first symbol is mapped.

23. (Currently Amended) The multi-carrier communication apparatus according to claim 16 58, wherein the Euclidean distance between a first symbol string and another first symbol string mapped by the mapping means and modulating section is equal to or greater than a predetermined distance.

24. (Currently Amended) The multi-carrier communication apparatus according to claim 16 58, wherein a first symbol string group and another first symbol string group mapped by the mapping means and modulating section have different positions of subcarriers to which the first symbol is mapped.

25. (Currently Amended) The multi-carrier communication apparatus according to claim 16 58, wherein the mapping means and modulating section associates one data pattern with a plurality of first symbol strings and the transmitting means section sends any one of said plurality of first symbol strings.

26. (Currently Amended) The multi-carrier communication apparatus according to claim 25, wherein the Euclidean distance between a first symbol string corresponding to one data piece to be sent and another first symbol string corresponding to said data to be sent mapped by the mapping means and modulating section is equal to or smaller than the Euclidean distance from the other first symbol string.

27. (Currently Amended) The multi-carrier communication apparatus according to claim 16 58, wherein the mapping means and modulating section places a first symbol on a subcarrier different from the one on which the first symbol was placed in the past in the first symbol string to be sent.

28. (Currently Amended) The multi-carrier communication apparatus according to claim 27, wherein the mapping means and modulating section comprises an insertion position ~~storing means~~



~~for storing~~ storage section that stores the position and timing of the first symbol in the first symbol string.

29. (Currently Amended) The multi-carrier communication apparatus according to claim 27, wherein the mapping means and modulating section comprises a random number generating means for determining generator that determines the position and timing of the first symbol in the first symbol string according to random numbers.

30. (Currently Amended) The multi-carrier communication apparatus according to claim ~~16~~ 58, wherein the mapping means and modulating section uses a set of a plurality of first symbols for the first symbol and maps from the data pattern to the first symbol string.

31. (Currently Amended) The multi-carrier communication apparatus according to claim ~~16~~ 58, further comprising a first spreading means for spreading section that spreads a symbol string at a predetermined spreading rate.

32. (Currently Amended) The multi-carrier communication apparatus according to claim 31, wherein the first spreading

means section spreads the first symbol string including the first symbol mapped by the mapping means and modulating section at a predetermined spreading rate.

33. (Currently Amended) The multi-carrier communication apparatus according to claim 31, wherein the first spreading means section multiplies the second symbol string obtained by modulating data to be sent by a spreading code and the mapping means and modulating section maps said second symbol string to subcarriers with the first symbol string including the first symbol.

34. (Currently Amended) The multi-carrier communication apparatus according to claim 32, further comprising a ~~serial-parallel converting means for converting~~ converter that converts from serial to parallel the first symbol string including the first symbol spread at a predetermined spreading rate by the first spreading means section.

35. (Currently Amended) The multi-carrier communication apparatus according to claim 31, further comprising a ~~serial-parallel converting means for converting~~ converter that converts a symbol string from serial to parallel, wherein the

first spreading means section spreads said symbol string converted from serial to parallel at a predetermined spreading rate.

36. (Currently Amended) The multi-carrier communication apparatus according to claim 35, wherein the serial-parallel ~~converting means~~ converter converts from serial to parallel the first symbol string including the first symbol mapped by the mapping means and modulating section.

37. (Currently Amended) The multi-carrier communication apparatus according to claim 35, wherein the mapping means and modulating section maps the symbol string spread by the first spreading means section.

38. (Currently Amended) The multi-carrier communication apparatus according to claim 35, further comprising a second spreading means for spreading section that spreads the first symbol string including the first symbol mapped by the mapping means and modulating section at a predetermined spreading code, wherein the serial-parallel ~~converting means~~ converter performs serial-parallel conversion on the first symbol string multiplied by said spreading code by the second spreading means section.

39. (Currently Amended) The multi-carrier communication apparatus according to claim 35, further comprising a second spreading means for spreading section that spreads the second symbol string at a predetermined spreading rate, wherein the serial-parallel converting means performs serial-parallel conversion on the second symbol string multiplied by said spreading code by the second spreading means section and the mapping means and modulating section performs mapping processing on the signal spread by the first spreading means section.

40. (Currently Amended) The multi-carrier communication apparatus according to claim 38, further comprising a two-dimensional interleave means for performing interleaver that performs chip-by-chip rearrangement on a spread signal in order of subcarriers and in order of transmission times.

41. (Currently Amended) The multi-carrier communication apparatus according to claim 31, further comprising a second third spreading means for spreading section that spreads the signal spread by the first spreading means section using spreading codes which differ from one communication apparatus to another at a predetermined spreading rate.

42. (Currently Amended) The multi-carrier communication apparatus according to claim 41, further comprising interleaving ~~means for performing~~ an interleaver that performs chip-by-chip rearrangement on the signal spread by the ~~third~~ second spreading means section.

43. (Currently Amended) The multi-carrier communication apparatus according to claim 31, further comprising interleaving ~~means for performing~~ an interleaver that performs chip-by-chip rearrangement on the signal spread by the first spreading means section.

44. (Currently Amended) The multi-carrier communication apparatus according to claim 43, further comprising a second ~~third spreading means for spreading~~ section that spreads the signal rearranged chip by chip by the ~~interleaving means~~ interleaver using codes which differ from one communication apparatus to another at a predetermined spreading rate.

45-49. (Canceled).

50. (Currently Amended) The peak power suppression method according to claim 49 63, wherein in the mapping ~~step~~ operation,

the second symbol string obtained by modulating data to be sent is mapped to subcarriers with the first symbol string including the first symbol.

51. (Currently Amended) The peak power suppression method according to claim 49 63, wherein in the mapping step operation, second data expressed with two discrete values to be sent is converted to first data expressed with three discrete values and said first data is modulated to a first symbol string including the first symbol.

52. (Currently Amended) The peak power suppression method according to claim 49 63, wherein in the demapping step operation, a multi-carrier signal mapped to subcarriers with the first symbol string including the first symbol is demapped to a second symbol string excluding said first symbol in predetermined symbol units and the demapped symbol pattern is demodulated to obtain reception data.

53. (Currently Amended) The peak power suppression method according to claim 49 63, wherein in the demapping step operation, a multi-carrier signal mapped to subcarriers with the first symbol string including the first symbol is demodulated and

the demodulated first data expressed with three discrete values is converted to second data expressed with two discrete values.

54. (Currently Amended) The peak power suppression method according to claim 49 63, wherein the demapping step operation includes ~~an amplitude measuring step of~~ measuring the amplitude of a symbol mapped to each subcarrier and ~~a pattern deciding step of~~ deciding said first symbol string based on the measured amplitude.

55. (Currently Amended) The peak power suppression method according to claim 49 63, ~~the transmitter side further comprising: a notifying step of~~

notifying the receiving apparatus side of the number of subcarriers to which a first symbol with amplitude "0" is mapped, and

~~the demapping step operation on the receiver side further comprising~~ comprising:

~~a first deciding step of~~ deciding a subcarrier to which said first symbol is mapped according to the number of subcarriers to which the first symbol with amplitude "0" is mapped; and

~~a second deciding step of~~ deciding polarity about symbols other than said first symbol.

56. (Currently Amended) The peak power suppression method according to claim 49 63, ~~the transmitter side further comprising: a transmitting step of~~  
~~transmitting a known signal; and~~  
~~the receiver side further comprising:~~  
~~a receiving step of receiving said known signal;~~  
~~a channel estimating step of estimating channels using said~~  
~~received signal;~~  
~~a replica signal generating step of generating a replica~~  
~~signal with the first symbol string including the first symbol~~  
~~using the result of said channel estimation;~~  
~~a received symbol pattern deciding step of deciding a~~  
~~received symbol pattern by comparing said replica signal with the~~  
~~received symbol pattern; and~~  
~~a demodulating step of obtaining reception data from the~~  
~~decided received symbol pattern.~~

57. (New) A multi-carrier communication apparatus comprising:  
  
a receiving section that receives a multi-carrier signal in which transmission data is mapped to subcarriers with a first symbol string at a communicating party, said first symbol string being selected from symbol patterns that include a first symbol



with an amplitude of at least one of an in-phase component and a quadrature component set to "0" and have a greater number of patterns than symbol patterns that do not include the first symbol; and

a demapping and demodulating section that demaps said multi-carrier signal received at said receiving section, demodulates demapped symbol patterns, and obtains reception data.

58. (New) A multi-carrier communication apparatus comprising:

a mapping and modulating section that maps transmission data to subcarriers with a first symbol string, said first symbol string being selected from symbol patterns that include a first symbol with an amplitude of at least one of an in-phase component and a quadrature component set to "0" and have a greater number of patterns than symbol patterns that do not include the first symbol; and

a transmitting section that transmits mapped multi-carrier signals.

59. (New) A communication terminal apparatus equipped with a multi-carrier communication apparatus, said multi-carrier communication apparatus comprising:

a receiving section that receives a multi-carrier signal in which transmission data is mapped to subcarriers with a first symbol string at a communicating party, said first symbol string being selected from symbol patterns that include a first symbol with an amplitude of at least one of an in-phase component and a quadrature component set to "0" and have a greater number of patterns than symbol patterns that do not include the first symbol; and

a demapping and demodulating section that demaps the multi-carrier signal received at said receiving section, demodulates demapped symbol patterns and obtains reception data.

60. (New) A base station apparatus equipped with a multi-carrier communication apparatus, said multi-carrier communication apparatus comprising:

a receiving section that receives a multi-carrier signal in which transmission data is mapped to subcarriers with a first symbol string at a communicating party, said first symbol string being selected from symbol patterns that include a first symbol with an amplitude of at least one of an in-phase component and a quadrature component set to "0" and have a greater number of patterns than symbol patterns that do not include the first symbol; and

a demapping and demodulating section that demaps said multi-carrier signal received at said receiving section, demodulates demapped symbol patterns and obtains received data.

61. (New) A communication terminal apparatus equipped with a multi-carrier communication apparatus, said multi-carrier communication apparatus comprising:

a mapping section that maps transmission data to subcarriers with a first symbol string, said first symbol string being selected from symbol patterns that include a first symbol with an amplitude of at least one of an in-phase component and a quadrature component set to "0" and have a greater number of patterns than symbol patterns that do not include the first symbol; and

a transmitting section that transmits mapped multi-carrier signals.

62. (New) A base station apparatus equipped with a multi-carrier communication apparatus, said multi-carrier communication apparatus comprising:

a mapping section that maps transmission data to subcarriers with a first symbol string, said first symbol string being selected from symbol patterns that include a first symbol with an

amplitude of at least one of an in-phase component and a quadrature component set to "0" and have a greater number of patterns than symbol patterns that do not include the first symbol; and

a transmitting section that transmits mapped multi-carrier signals.

63. (New) A peak power suppression method comprising:

mapping transmission data to subcarriers with a first symbol string on a transmitting apparatus side, said first symbol string being selected from symbol patterns that include a first symbol with an amplitude of at least one of an in-phase component and a quadrature component set to "0" and have a greater number of patterns than symbol patterns that do not include the first symbol; and

transmitting the mapped multi-carrier signal;

receiving the multi-carrier signal mapped to the subcarriers with the first symbol string including said first symbol on a receiving apparatus side; and

demapping said multi-carrier signal, demodulating demapped symbol pattern, and obtaining reception data.